

**Abstract**

A three dimensional imaging system is disclosed which includes a three dimensional display (12), three-dimensional calibration equipment (16), and one or more two-dimensional (15) or three dimensional (14) image scanners. The three-dimensional display (12) uses optical pulses (32a-32k) and a non linear optical mixer (18) to display a three-dimensional image (17). The three-dimensional image (17) is generated in voxels of the display volume (28) as the optical mixer (18) sweeps the display volume (28). The three-dimensional calibration equipment (16) uses a hologram projected proximal to a desired object (164) to calibrate optical imaging devices (162a-162c) and to simplify the combination of the images from one or more optical imaging devices (162a-162c) into three-dimensional information. The three-dimensional image scanner (14) employs optical pulses (136, 138) and a non-linear optical mixer (128) to acquire three-dimensional images of a desired object (134). The three-dimensional image scanner (14) captures both the shape and color of a desired object (134). (Figure 1)